International Journal of Advanced Scientific Research
ISSN: 2456-0421; Impact Factor: RJIF 5.32
www.allscientificjournal.com
Volume 1; Issue 7; October 2016; Page No. 43-47

Validating the framework of factors influencing creative process for RN-BSN students in Taiwan

[1] Ya-Lie Ku, [2] Chin Tang Tu, [3] Chien-Lin Kuo, [4] Pei-Yu Lee

[1, 3, 4] RN, MSN, Associate Professor, Department of Nursing, Fooyin University, No. 151, Jinxue Rd, Daliao District, Kaohsiung City, Taiwan
[2] PhD, Associate Professor, Center for Teacher Education, National Kaohsiung Normal University, No. 116, Heping 1st Rd, Lingya District, Kaohsiung City, Taiwan

Abstract
This study was to validate the framework of factors influencing creative process for RN-BSN students in Taiwan. This is a measurement study and the initially hypothesized framework containing three factors-characteristics, abilities, and barriers of the framework which were correlated significantly to each other, and could influence the motivation of creativity among RN-BSN students in Taiwan. To confirm the framework, the statistical skill of AMOS 21.0 was applied by following Structural Equations Modeling. This study was conducted from August 2012 to July 2013 with IRB approved. The initially hypothesized framework was not validated; however, the refined framework indicated that the abilities (r=.65) and the barriers(r=.60) were moderately correlated to the motivation of creativity among RN-BSN students in Taiwan, but the characteristics were not. Nevertheless, the characteristics were highly correlated with the abilities (r=.91), but was lowly correlated with the barriers (r=.19), and there is no relationship between the abilities and barriers.

Keywords: framework, creativity, nursing, education

1. Introduction
In the 21st century requires innovation and adaptation to the environment. In the nursing workplace, the purpose of creativity is to improve the staff's performance and enhance the quality of patient care. Nursing organizations have encouraged nurses to design innovative products and services through nationwide creativity contests [1]. Although creativity has been examined by many scholars, particularly in psychology and education [2], few studies have examined creativity in nursing context. Whether nursing educators can successfully inspire creativity in students remains unclear. To cultivate nursing students' creativity, researchers have developed a framework of creative thinking teaching mode for RN-BSN students on the basis of the creative process of clinical nurses in Taiwan [3]. Based on the framework, the research team developed and validated a questionnaire of factors influencing creative process for RN-BSN students in Taiwan with a good reliability and validity [4].

There are four factors in the questionnaire including the characteristics, abilities, barriers, and motivation [4]. The characterisitcs factor contains the indicators of openness and perseverance as well as thinking and integration. The abilities factor contains the indicators of association and change. The barriers factor contains with the indicators of resources and working environment, as well as training and cooperation. The motivation factor contains the indicators of achievement and self-confidence, as well as professional growth. The purpose of this study was to validate the framework of factors influencing creative process for RN-BSN students in Taiwan.

2. Literature
The literature review is divided into two sections; the creative models and factors that influence creativity.

2.1 Creativity Models
Five creativity models have been introduced. Wallas [5], in *The Art of Thought*, proposed one of the first creativity models, describing the stages of creativity as preparation, incubation, intimation, illumination, and verification. Another theory developed by early psychologists [6] was "the four Ps," - process, product, person, and place, which attempted to describe thought mechanisms and techniques for creative thinking. Furthermore, Baker, Rudd, and Pomeroy [7]attempted to construct a model for a creative thinking that stimulated the creativity of students and studied the five major factors of interpersonal variables; personal and educational, creative attribute, cultural, and biological variables. Moreover, the Four-C Model of creativity viewed at creativity as a developmental process, using the Big-C to represent creative genius, Little-C to represent the creativity inherent in everyday life, Mini-C to represent creativity that occurs during the learning process, and Pro-C to present expert-level creativity [8]. Finally, Shen [9] proposed three components with six stages through the Creative Problem-Solving (CPS) model, which included understood problems, inspired ideas, and prepared action of three components and identified plight, information, problems, ideas, solutions and acceptances of six steps.

2.2 Factors Influencing Creativity
The literature stated that motivation, characteristics, abilities, and barriers influence creativity. Motivation is a critical factor in developing creativity among students [10]. Amabile [11], Sternberg and Lubart [12], and Csikszentmihalyi [13] all emphasized the importance of intrinsic motivation, which included self-challenging and amusement, rather than rewards and future career advantages, and valued the role of intrinsic motivation in facilitating individuals' creativity. Intrinsic

motivation for creativity is enhanced by a nurturing environment, the ability to function independently, and a willingness to take risks [14]. An empirical study of 3,330 students in 43 schools of Taiwan indicated that the internal motivation of students directly influenced their creativity [15].

Regarding the characteristics factor, creative personality traits include curiosity, desires for adventures, challenges, and imagination [16]. Additionally, Runco [17] proposed that creative traits include autonomy, self-control, strain, sensitivity, and tolerance for ambiguity, and contradiction. Furthermore, Yeh [18] indicated that characteristics that promote creativity include willing to work hard, courage, self- confidence, perseverance, and optimism. The three most influential sub-criteria for the development of creativity among college students are "oppression of environmental behavior, respect for intellectual property," and "integration of creative education [19].

Regarding the abilities factor, sensitivity, fluency, flexibility, originality, and elaboration are considered five creative abilities [16]. Regarding fluency, flexibility, and originality, the creative abilities of nursing students have been defined as the ability to apply fluency, flexibility, and uniqueness in designing nursing interventions [20], for improving creativity of nursing students in two-year program [21], for the minority community population [22], nursing education [23], clinical case studies and practicum among RN-BSN students [24], and a nursing capstone course for cultivating creative development regarding association, connection, substitution, and transformation among RN-BSN students [25].

Barriers factor includes individual, problem-solving, environmental and organizational barriers [16]. Individual barriers include negative attitudes, lack of confidence, fear of criticism, false senses of success, comparative tendencies, negative experiences, lack of self-awareness, negative feelings and emotion, familiar requests, compulsive obedience, habits and dependence, delusion and reminiscence, apathy and isolation. Problem-solving barriers included tone-side thinking, prejudgment, flippant responses, excessive thinking, and lack of prudence. Environmental and organizational barriers include influential factors such as family, schools, and society.

Csikszentmihalyi [13] asserted that creativity cannot be detached from society, history, and culture. Creativity has been found to be aroused by environmental stimuli, such as interaction among peers and parents as well as availability of time and space [26]. According to Longo [27], key strategies for enhancing creativity include providing time for education, assigning creative work, and encouraging risk-taking. Similarly, Chan [28] identified that four themes as diversity learning, free learning, confident learning, and team-cooperation learning after content analysis of eight qualified articles by a systematic review literature about creative thinking and creativity in nursing education. Educational scholars, including Wu, Wu, Chen, and Chen [19], by reviewing the relevant literature, have identified four dimensions of factors that influence creativity: individual qualities, family background, school characteristics, and community. The community dimension, including "social education and cultural environment," most strongly influences creative development among college students [19].

3. Methods

This was a measurement study and the framework hypothesized in this study considered three factors, characteristics, abilities, and barriers which correlated significantly with one another and could influence the motivation of creativity among RN-BSN students in Taiwan. The AMOS 21.0 statistical method [29] was applied through Structural Equations Modeling (SEM) to confirm the framework. This study was conducted from August 2012 to July 2013with institutional review board (number FYH-IRB-101-07 -01-A).

4. Results

Footnotes should be typed in singled-line spacing at the bottom of the page and column where it is cited. Footnotes should be rare.

4.1 The Hypothesized Framework

The initially hypothesized framework contained three factors, characteristics, abilities, and barriers, which correlated significantly with one another, and could influence the motivation for creativity among RN-BSN students in Taiwan. The hypothesized framework is shown in Figure 1.

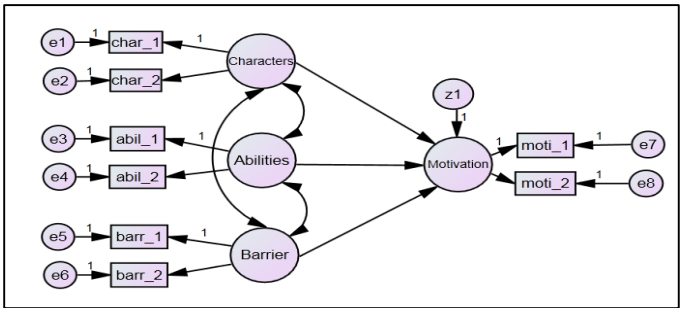

Fig 1: The Hypothesized Framework

4.2 The Refined Framework

After the statistical test was performed using the AMOS 21.0, the hypothesized framework was not validated; however, the refined framework indicated that the abilities (r=.65) and the barriers(r=.60) moderately correlated with the motivation of creativity among RN-BSN students in Taiwan, but the characteristics did not. However, the characteristics strongly correlated with the abilities (r=.91), but weakly correlated with the barriers (r=.19), and no relationship was found between the abilities and barriers. The refined framework is shown in Figure 2.

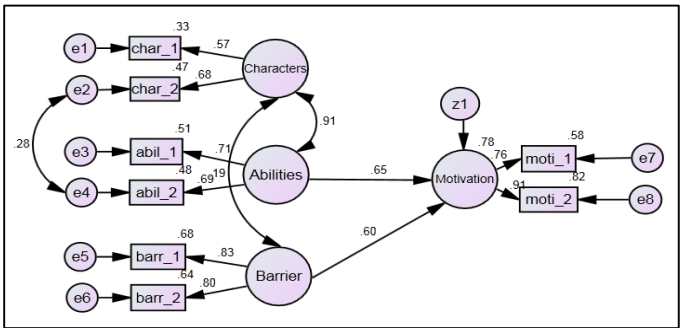

Fig 2: The Refined Framework

The refined framework supported the preliminary fit criteria because the product- moment correlation coefficient between factors did not exceed 1 and the variance of each factor and error did not contain a negative value [30]. However, the goodness-of-fit of the revised model should have indicated all

$X^2/P>.05$, GFI > .9, RMR<.05, RMSEA <.1, AGFI> .9 (Rong, 2009). The refined framework only indicated GFI > .9, but the fit of the other indicators was not satisfactory. The goodness-of-fit of the refined model is shown in Table 1.

Table 1: The Goodness-of-Fit of the Refine Model (N=200)

	X^2	X^2/df	P	GFI	RMR	RMSEA	AGFI
Revised Model	47.06 ***	3.14	*** p <.001	.947	.251	.104	.873

Furthermore, regarding the fit of the internal structure of the refined framework, the individual reliability and Average Variance Extracted (AVE) exceed 0.5, and the composite reliability should exceed 0.6 [30]. Only the barriers and motivation factors in the refined framework approached satisfactory levels; however, the characteristics and abilities factors did not meet the criteria of the internal structure. The internal construct of the revised framework is shown in Table 2.

Table 2: Internal Construct of the Refined Model (*N*=200)

Factor	Subscale	Individual Reliability	Composite Reliability	AVE
Characters	char_1	0.33	0.57	0.40
	char_2	0.47		
Abilities	abil_1	0.51	0.66	0.49
	abil_2	0.48		
Barriers	barr_1	0.68	0.80	0.66
	barr_2	0.64		
Motivation	moti_1	0.59	0.82	0.70
	moti_2	0.82		

5. Discussion

5.1 Creativity Model

Compared with the five models of creativity in the literature, the refined framework in this study placed more emphasis on the preparation stage, and was more person-centered, focusing on personal variables [5, 6, 7], including the four factors of characteristics, abilities, barriers, and motivation influencing the creativity[4]. However, the refined framework in this study was not similar to the Four-C model of creativity, which views creativty as a developmental process [8], or the CPS model, which was designed to teach students to slove problems creatively [9].

5.2 Factors Influencing Creativity

The refined framework in our study included characteristics, abilities, barriers, and motivation facors. The characterisitics factor contained the indicators of openness and perseverance as well as thinking and integration, and perseverance was represented as in Yeh's [18] proposition for the characteristics of creative individuals, but differently from challenge [16] and strain [17]. The indicator of thinking and integration were similar to "respect for intellectual property," and "integration of creative education" [19]. However, Instead of characteristics, Chen [31] proposed that domain knowledge accounted more for the modeling of creativity based on the meta-analysis of domestic studies in Taiwan.

The creative abilities factor contained the indicators of association and change, which were similar to those in a nursing capstone course for cultivating creative development regarding association, connection, substitution, and transformation among RN-BSN students [25], rather than fluency, flexibility, and originality in RN-BSN students [16, 20, 21, 22, 23]. However, the abilities of sensitivity and creative elaboration were not explored in this study.

The barriers for creativity factor in this study contained the indicators of resources and working environment as well as training and cooperation, which were similar to the environmental and organizational barriers [16, 19, 26, 27], but not the barriers of the individuality and problem-solving [16]. Additionally, thinking was categorized as the habit and barrier in the literature [16], but as the characteristic in this study, but. Furthermore, negative attitudes, emotion, and experiences were not explored in this study.

The motivation factor contained the indicators of achievement, self-confidence, and professional growth. The literature indicates that intrinsic motivation, including amusement and self-challenge, most strongly influences the creativity of students, rather than rewards and future career advantages [10, 11, 13, 15, 33], which is similar to the achievement and self-confidence indicator, but not the professional growth indicator in this study. Nevertheless, Kris and Shalini [32] proposed that individuals will increase creative performance when they are given more positive and contingent rewards.

Additionally, motivation was correlated with abilities and barriers in this study. While the abilities referenced by Fasnacht [14] are similar to the characteristics of creativity in the literature, but not the indicator of association and change in this study. Furthermore, motivation was enhanced by a nurturing environment, ability to function independently, and willingness to take risks [14]. A nurturing environment has been reported as similar to the indicators of resources and working environment as well as training and cooperation, which were categorized as barriers to creativity in this study.

6. Conclusion

According to our findings, motivation was the most important part of the framework, which was correlated with abilities and barriers, and was affected indirectly by the interaction of characteristics and abilities as well as characteristics and barriers. The authors hypothesized that increasing abilities while reducing barriers could model the characteristics, which might inspire creative motivation among RN-BSN students in Taiwan. According to the findings in this study, the characteristics of creativity could be cultivated among nursing students when the creative abilities have been trained and enhanced, at the same time their barriers of creativity have

been reduced.

Additionally, based on the perspectives of the previously mentioned scholars, the authors could also infer that the creativity of RN-BSN students was developed through interactions with other students at school, family, coworkers, and society. The interactions could have reduced the barriers toward creativity and cultivated the creative characteristics and abilities of nursing students. The authors suggested to developing the strategies of improving nursing students to interact with other students at school, family, coworkers, and society in the future study to gain more resources and divergent thinking across different fields.

The refined framework was derived from the nurses' experiences during clinical practice, providing a guide for nursing curriculum design in teaching creativity. The authors suggest that nursing educators design a curriculum based on the refined framework to increase the creative skills of RN-BSN students regarding association and change as well as their cooperative strategies in the workplace, and reduce their creative barriers caused by lack of resources. The whole map of our future research, according to the Four- C model [8], was to cultivate the creativity of nursing students by increasing their Mini-C, which indicates creativity attained through learning, based on their Little-C, which indicates creativity attained in everyday life, through their Pro-C, which indicates the expert-level creativity of their teachers.

7. Acknowledgements

We wish to thank the National Science Council for supporting this study (Grant no. 101-2511-S-242-002) and also extends special thanks to all the clinical RN-BSN students from various hospitals for their participation and cooperation. Additionally, most sincere thanks are extended to the two nursing faculties and two part-time research assistants who conducted the data collection and organization. The dean of the Nursing College and head of the Nursing Department at Fooyin University are particularly appreciated for their administrative support.

8. References

1. Taiwan Nurse Association Message. http://www.twna.org.tw 12 may, 2005.
2. Hu MLM. Content analysis of researches on creativity and personality in Taiwan. Educational Journal. 2006; 26:215-239.
3. Ku YL, Kuo CL. Develop a teaching framework of creative thinking in nursing education on the creative process of clinical nurses in Taiwan. Innovations in Education and Teaching International. 2016; 53(4):424-434.
4. Ku YL, Lee PY, Tu CT, Shen MH, Kuo CL. Validating the questionnaire of factors influencing creative process for RN-BSN students in Taiwan. Journal of Nursing Education and Practice, 2015; 5(5):55-64.
5. Wallas G. The art of thought. Harcourt, Brace & World, New York, 1926.
6. Rhodes M. An analysis of creativity. Phi delta Kappa International, 1961; 42(7): 300-310.
7. Baker M, Rudd R, Pomeroy C. Relationships between critical and creative thinking. Journal of Southern Agricultural Education Research, 2001; 51(1):173-188.
8. Kaufman JC, Beghetto RA. Beyond big and little: The Four C Model of creativity. Review of General Psychology, 2009; 13:1-12.
9. Shen SL. Creative idea and design. Wu-Nan Book, Taipei, 2010.
10. Lin PF, Chiou H. Construction and related study of the inventory of self-efficacy for creative teaching. Journal of Educational Research and Development, 2008; 4(1):141-170.
11. Amabile TM. Creativity in context: Update to" the social psychology of creativity." Westview press, New York, 1996.
12. Lubart TI. Models of the creative process: Past, present and future. Creativity Research Journal, 2001; 13:295-308.
13. Csikszentmihalyi M. Creativity: flow and the psychology of discovery and invention. Harper Collins, New York, 1996.
14. Fasnacht PH. Creativity: a refinement of the concept for nursing practice. Journal of Advanced Nursing. 2003; 41(2):195-202.
15. Hsia CC. A study on influential factors of students' creativity: The three-level analysis as analytic framework. Journal of Special Education, 2011; 3:151-178.
16. Chen LN. Creative Thinking Teaching Theory and Practice. Psychology Publicaiton, Taipei, 2008.
17. Runco MA. Creativity and education. New Horizons in Education, 2008; 56(1):1-8.
18. Yeh GF. Principles and Application of Innovation. Yang-Chih Book, Taipei, 2011.
19. Wu HY, Wu HS, Chen I, Chen HC. Exploring the critical influential factors of creativity for college students: A multiple criteria decision-making approach. Thinking Skills and Creativity, 2014; 11:1-21.
20. Ku YL, Kao Lo CH, Sheu, S. The Application of Creative Teaching Strategies into the Teaching Protocol of Nursing Concepts. Journal of Nursing. 2003; 50(3):83-87.
21. Ku YL, Kao Lo CH, Wang JJ, Hsieh JL, Chen KM. The Effectiveness of Teaching Strategies for Creativity in a Nursing Concepts Teaching Protocol on the Creative Thinking of Two-Year RN-BSN Students. The Journal of Nursing Research. 2002; 10(2):105-112.
22. Tsai HY, Tsai YN, Chiang HF, Lin YP, Yeh LH, Tsai HT *et al*. Applying the creative nursing activities into a case of family nursing process. Chang Gung Nursing, 2011; 22(2):288-299.
23. Ku YL, Chang CF, Kuo CL, Sheu S. The application of creative thinking teaching in nursing education. Journal of Nursing, 2010; 57(2):93-98.
24. Ku YL. Evaluating creative thinking of RN-BSN students in the course of clinical case study and practicum. Innovations in Education and Teaching International, 2015; 52(3):290-299.
25. Ku YL, Lee PY, Shen MH, Kuo CL. Constructing and Evaluating a Nursing Capstone Course for Cultivating Creativity in RN-BSN Students in Taiwan. Journal of Nursing Education and Practice, 2014; 4(7):1-10.
26. Dodds RA, Smith SM, Ward TB. The use of environmental clues during incubation. Creativity Research Journal. 2002; 14:287-304.
27. Longo A. Change, complexity, and creativity. In L. Roussel (Ed.), Management and leadership for nurse administrators. Jones & Bartlett Learning, Burlington, MA, 2013, 122-159.
28. Chan ZC. A systematic review of creative thinking /

creativity in nursing education. Nurse Education Today, 2013; 33(11):1382-1387.
29. Rong TS. AMOS and Research Method: Analysis of Moment Structures. Wu-Nan Book, Taipei, 2009.
30. Bagozzi RP, Yi Y. On the evaluation of structural equation models. Journal of the Academy of Marketing Science. 1988; 16:74-94.
31. Chen YC. The structure of the affected student's creativity and creative thinking teaching the treatment effect of the meta-analysis. Unpublished Doctoral Dissertation, Kaohsiung Normal University, Kaohsiung, 2010.
32. Kris B, Shalini K. Rewards and creative performance: A meta-analytic test of theoretically derived hypotheses. Psychological Bulletin, 2012; 138(4):809-830.
33. Sternberg RJ, Lubart TI. Defying the crowd: Cultivating creativity in a culture of conformity. New York Press, New York, 1995.